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Title: Immunodetection and partial cDNA sequence of the proteoglycan, superficial zone protein, synthesized by cells lining synovial joints.

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Abstract: We have previously described a large proteoglycan named superficial zone protein that was isolated and purified from culture medium of superficial slices of bovine articular cartilage. Monoclonal antibodies were raised against superficial zone protein and used as probes in Western blot analyses for immunohistochemical studies both to determine precisely which cells within the joint synthesize the proteoglycan and to isolate a cDNA fragment from a bovine chondrocyte lambda gt11 library that encodes part of the proteoglycan. The cDNA fragment that was obtained with use of monoclonal antibody 6-A-1 encodes the 3' end of the sequence for superficial zone protein. On Western blots, monoclonal antibody 3-A-4 recognized an epitope on native, but not reduced, superficial zone protein, whereas monoclonal antibody 6-A-1 reacted with both native and denatured antigen. The proteoglycan was immunolocalized with monoclonal antibody 3-A-4 in chondrocytes predominantly within the superficial zone of fetal and adult articular cartilage and in some cells of the synovial lining. However, the proteoglycan was not detected in chondrocytes deep in articular cartilage, in nasal septal cartilage, or in synovial stromal cells. The only matrix staining positively for superficial zone protein was at the articular surface bordering the synovial cavity in adult, but not fetal, joints. Isolated chondrocytes and synovial cells showed intracellular binding of monoclonal antibody 3-A-4, and flow-cytometric analysis with the antibody gave the following percentages of immunopositive cells: 37.4, 52.5, 3.4, and 7.5 from chondrocytes from the full-thickness, superficial, and deep zones and from synovial cells, respectively. Thus, both chondrocytes and synovial cells bordering the joint cavity synthesize superficial zone protein and substantiate its usefulness as a phenotypic marker of particular cellular species lining the articular cavity.

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